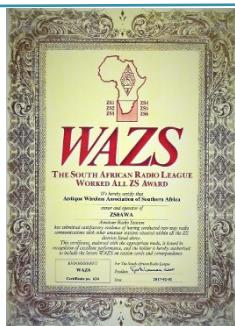




A Member  
of the  
SARL



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#### AWA Committee:

- \* President and Western Cape—John ZS1WJ
- \* VicePresident—Renato ZS6REN
- \* Technical Advisor—Rad ZS6RAD
- \* Secretary/PRO—Andy ZS6ADY
- \* KZN—Don ZS5DR
- \* Historian—Oliver ZS6OG
- \* Member—Jacques ZS6JPS

# Newsletter

The Antique Wireless Association of Southern Africa

# 157

August 2019

## Reflections:

Being a bit of a techno junkie and a lover of valve radio, often has its drawbacks.

I must say, that I look at some of the new modern rigs that are coming out with the SDR type touch screens and plug and play systems and I start to get itchy fingers.

I would love to have one of them to play with for say, a month or two, but that's never going to happen. I would love to see if my hankering for these modern plastic infused bits and pieces is really justified.

Don't get me wrong here, I think if you can afford to own one of these radio's then go for it. My problem is that I could never justify, to myself, to spend that much money on a new radio.

Maybe it is because of my age, that I think to myself "its more than I paid for my first car". Which was also second hand by the way.

To have the ability to see a signal halfway down the band from where I am tuned at the moment, and just touch my finger to the screen and be automatically tuned to that point within a matter of seconds, is actually mind blowing.

This is where the techno junky side of me comes in. Its not just that you don't have to set the plate and loading and tune up using the preselect to get maximum smoke, but just the idea of it all happening on its own.

But then, maybe it's the Scot in my blood (not the Scotch) that always seems to take over and question how much one has to pay for the simplicity of it all.

I even love the look of some of these new bionic artefacts. They are bright and cheery and have all the bells and whistles that one desires, even if they are

still black. I wonder if one would ever get to operate it at its full capacity, utilising all of the bells, never mind the whistles.

I can just imagine how many pages the instruction manual must have. Unless you have a bionic brain, you will never remember how to use all the programmes available.

Then I switch on the old FT101ZD. Give it a few minutes to warm up while the heater puts voltage into the final valves. Turn to "Tune", key the rig and set the plate, preselect and loading to 100 watt output on the meter. Set the rig to CW, call CQ, CQ and hear a station come back with a report of 599, and my heart misses a beat. It may be nearly 50 years old, bit younger than I am, but it can do exactly what the bionic automaton can without any problem.

Best 73

DE Andy ZS6ADY

## WIKIPEDIA

### Modes of communication:

**Multiple frequency-shift keying (MFSK)** is a variation of frequency-shift keying (FSK) that uses more than two frequencies. MFSK is a form of M-ary orthogonal modulation, where each symbol consists of one element from an alphabet of orthogonal waveforms. M, the size of the alphabet, is usually a power of two so that each symbol represents  $\log_2 M$  bits.

### MFSK in HF communications

Skywave propagation on the high frequency bands introduces random distortions that generally vary with both time and frequency. Understanding these impairments helps one understand why MFSK is such an effective and popular technique on HF.

#### Delay spread and coherence bandwidth

When several separate paths from transmitter to receiver exist, a condition known as multipath, they almost never have exactly the same length so they almost never exhibit the same propagation delay. Small delay differences, or delay spread, smear adjacent modulation symbols together and cause unwanted intersymbol interference.

Delay spread is inversely proportional to its frequency-domain counterpart, coherence bandwidth. This is the frequency range over which the channel gain is relatively constant. This is because summing two or more paths with different delays creates a comb filter even when the individual paths have a flat frequency response.

## HF Happenings:

The **All Africa Award** is sponsored by the South African Radio League. Its aim is to encourage more QSOs with African countries. Applicants must prove having contacted the following 31 areas - One contact with a station in each of the six call areas of South Africa (ZS1 to ZS6) and one contact in each of 25 African countries outside South Africa.

Only contacts with stations on the African continent are valid. Islands and ship-based stations do not count. "Country" means an entity included in the DXCC entities list maintained by the ARRL.

Deleted countries also count, if contacts were made while the country existed. ZS3 stations in South West Africa (before 1990) count as Namibia.

<http://www.sarl.org.za/public/awards/awards.asp>



### What to drink during a Contest? (A wee dram!)

GearHungry.com published an updated list of the best energy beverages. Old-school contestants use coffee to go the distance, but the younger demographic may prefer Monster Energy Drink Zero Ultra, which according to the article is, "Packed with ginseng for energy and far less carbonation than regular energy drinks..." [www.gearhungry.com/best-energy-drinks/](http://www.gearhungry.com/best-energy-drinks/).

### N1MM Logger+ in another language

Al, AB2ZY (akozak@hourglass.com) is a new member of the *N1MM Logger+* development team who is focused on preparing the popular logging program to support other languages beyond English. He's seeking a "set of user volunteers to work with me to get this ready for general distribution." According to Al, this team will "consist both of people who are willing to do translation work and those who wish to test translated languages." An experimental version of *N1MM Logger+* will be built from the production code base at regular intervals and made available to volunteers for testing. If you send mail to Al expressing an interest, please also tell him which language you'd like to help with, and whether you'd like to help with translation, testing, or both. (via *N1MM Logger+* group)

Al, AB2ZY (akozak@hourglass.com), is 'n nuwe lid van die N1MM Logger + ontwikkeling span wat hom toespits op die voorbereiding van die gewilde logboek program om ander tale te ondersteun, buiten Engels. Hy soek 'n stel gebruikers vrywilligers om saam met hom te werk om dit gereed te maak vir algemene verspreiding. Volgens Al sal hierdie span "bestaan uit mense wat bereid is om vertaalwerk te doen en diegene wat die vertaalde tale wil toets." 'n Eksperimentele weergawe van N1MM Logger

+ word met gereelde tussenposes uit die produksie kode basis gebou en beskikbaar gestel aan vrywilligers vir toetsing. As jy 'n e-pos aan Al stuur, vertel hom ook met watter taal jy wil help en of jy wil help met vertaling, toets of albei.

### The *N1MM Logger+* Spectrum Display

Posted to the *N1MM Logger+* Facebook group: "N6XI made a presentation to Northern California Contest Club (NCCC) featuring the *N1MM Logger+* Spectrum Display. It covers why you would want to use a spectrum display and why it is better when it is integrated into the logging program. The link is to a PDF of his *PowerPoint* presentation."

[https://n1mmwp.hamdocs.com/n1mmwpfiles/Download/Additional%20Support%20Files/N6XI%20\\_N1MM%2B%20Spectrum%20PowerPoint%20Presentation%20to%20NCCC.pdf?\\_t=1560359098](https://n1mmwp.hamdocs.com/n1mmwpfiles/Download/Additional%20Support%20Files/N6XI%20_N1MM%2B%20Spectrum%20PowerPoint%20Presentation%20to%20NCCC.pdf?_t=1560359098)

## Calendar:

### August

- 3 – Pretoria ARC Flea Market
- 4 – SARL HF Phone Contest
- 9 – National Women's Day; SARL YL Sprint
- 9 to 11 – Ride the Red Devil @ the Robertson Slow Food and Wine Festival
- 10 – SARL Youth Sprint
- 10 and 11 – WAE DX RTTY Contest; Namaqua Daisy Challenge, Vredendal
- 11 to 17 – YOTA 2019, Sofia Bulgaria
- 12 – International Youth Day; closing date HF Phone logs
- 16 – closing date YL logs
- 17 and 18 – International Lighthouse and Lightship Weekend
- 18 – SARL HF Digital Contest
- 19 – World Humanitarian Day
- 20 – Highway ARC meeting
- 23 – closing date for September Radio ZS
- 23 to 1 Sept – The Clanwilliam Wild Flower Festival
- 25 – SARL HF CW Contest
- 29 to 31 – Williston Winter Festival
- 30 and 31 – Hantam Vleisfees, Calvinia

## The GPS2Time program for FT2, FT4, FT6, FT8

In the July 2019 PCARS Newsletter, Jim, AC8NT and JC, KC3JXQ, describe using the GPS2Time program to keep your computer's clock correct for FT8 and FT4 communications using an inexpensive GPS receiver connected via USB. <https://www.vk4adc.com/web/software-projects/55-vk4adc-utils> According to the article, the software will "...sync your PC's clock at a period you set (say every 15 minutes). It will also provide an up to 10 character grid square, as well as latitude, longitude, and altitude." <http://www.portcars.org/wp/wp-content/uploads/2019/06/PCARS-July2019.pdf>

## African DX

*Contacts with stations on the African continent count towards the SARL's All Africa Award ([www.sarl.org.za/public/awards/awards.asp](http://www.sarl.org.za/public/awards/awards.asp))*

Morocco, CN. On 26 and 27 July and on 29 and 30 July, 5C1M will draw attention to the anniversary of the present king's coronation. QSL via RW6HS.



The Gambia, C5. Przemek, SP3PS will be active again as C5SP from The Gambia from 23 July to 5 August. He will operate SSB and FT8 on 20 to 6 metres. QSL via home call.

Somalia, 6O. Ken, LA7GIA, will once again return to Somalia and be active as 6O7O in September. His last activity was in January 2018 as 6O6O. He announced the following on his Web page (<https://www.la7gia.com/where-next>), "For a long time I have been planning where to go next. This time I decided to return to Somalia which I also activated in 2018. I really look forward to this trip! Planning a trip to Somalia involves many limitations and challenges wrt obtaining permissions, logistics, operation as well safety and security wise. I have obtained the license 6O7O and LoTW is already received by ARRL.

I have a better QTH than last time, this time also with more space for beverages to NA/EU and Asia. Everything is booked and in place like accommodation, flight, etc. I will be operating solo for exactly 14 days on all bands 160 – 10 m using mainly CW. If possible, also digital modes. If someone can send me an original Elecraft mic I might do some SSB as well... I will be using my upgraded Elecraft K3, 1 kW amplifier and various TX/RX antennas. 160 m: top loaded vertical; 80/40 m: full size verticals; 30, 17 and 12 m: dipole; 20, 15 and 10 m: My favourite 2 el Mosley beam; RX antennas: 200 – 230 m beverage to NA/EU and Asia; K9AY loop as backup; RemoteQTH.com equipment and controller.

QSL via M0OXO. Log will be uploaded to ClubLog. Donations are very much appreciated to PayPal ([kenneth@opskar.no](mailto:kenneth@opskar.no)). Anyone donating upfront will receive direct QSL and express LoTW! ADDED NOTE: Also check out Ken's FaceBook page at <https://www.facebook.com/L-A-7-G-I-A-DXpeditions-707222219710335>

## African Islands

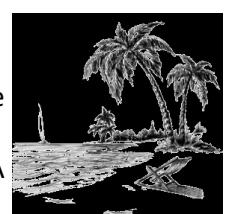
### IOTA Frequencies

CW: 28 040 24 920 21 040 18 098 14 040 10 114 7 030 3 530 kHz

SSB: 28 560 28 460 24 950 21 260 18 128 14 260 7 055 3 760 kHz

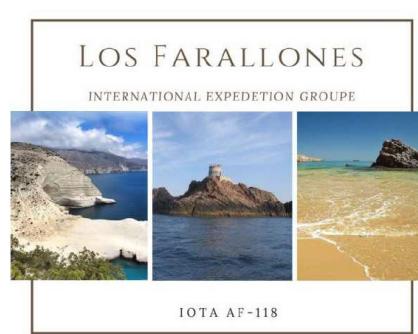
Cape Verde Islands, D4. Lukas, HB9EBT will be active from Sao Tiago (IOTA AF- 005) Cape Verde between 22 and 29 July using CW on 40 to 10 m. QSL via HB9EBT, direct or via the bureau.

Italian Africa, IH9. Raf, IH9YMC is going to join the IOTA contest from Pantelleria Island (IOTA AF-018, WW Loc. JM56XT). QSL via eQSL.



Algeria, 7X. Ed, DL8CX will be active together with a group of Algerian amateurs from the island of Sridjina (IOTA AF-104, WW Loc. JM36KW) between 25 and 29 July with activity on 80 to 6 m using CW and SSB and including an entry in the IOTA contest. QSL via bureau, ClubLog OQRS.

Morocco, CN. Los Farallones (IOTA AF-118, WW Loc. IM85MK) will be activated by CN8QY, CN8CE, CN8HDZ, CN8PA, CN8RAH, IK2PZC, IZ7ATN, I8LWL, and MM0NDX between 25 and 30 July with three rigs and using the call sign 5C9A. QSL via I8LWL, ClubLog OQRS. <https://5c9a.com/>



## ITU Zone maps

Tim, EI8IC, created ITU Zone maps for the just past "IARU HF Championships." In the description on the website, he notes that "the purpose for defining these zones was to create a coarse grid for calculating HF coverage plots using propagation prediction programs of the day, the predecessors of what evolved to become VOACAP, etc." Furthermore, some boundaries intending to represent the borders of countries clearly do not. According to Tim, it appears for the purposes of radio contesting, the boundaries can be specified as whatever the contest sponsor deems appropriate! <http://www.mapability.com/ei8ic/maps/ituzone.php>

## Word to the Wise

**Polar Flutter** - An occasional property of radio signals that traverse the polar region, characterized by rapid changes or pulses of the amplitude of the signal. Its presence can indicate a polar path that is almost open or almost closed, but certainly changing. The rapidity of the flutter can make copying signals extremely difficult.

## The South African Morse Code Revival

*Join the South African Morse Code Revival on air on 7 035 and 3 545 kHz after hours and weekends. From Wednesday 7 August, every Wednesday from 19:30 CAT on the Sandton 145,700 repeater.*

*Join the ZS-CW Facebook page at <https://www.facebook.com/groups/1988359131245538/> and contact Michael, ZS6MSW at [zs6msw@gmail.com](mailto:zs6msw@gmail.com) to join the ZS-CW WhatsApp Group!*

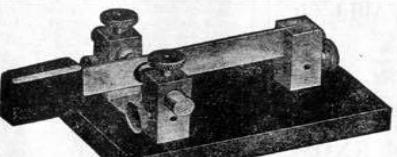
I've got to hand it to these guys, they are really serious about reviving CW in South Africa.

Mike ZS6MSW and Sean ZS6SR have been doing all they can to get as many people as possible back on to CW or to start CW from a new perspective. On a daily basis on their Facebook page they encourage their users with new concepts, old concepts and all sorts of information in between.

The AWA has been trying for years to encourage CW activity and we support these guys in their attempts to get CW active again. Who knows, it may just have such a good effect on our Ham community that we will also be looking for a spot on the band to play some CW.

The whole venture is being supported by so many different groups. Even the Hammies have expressed an interest in CW and we will be starting a CW group on the Sandton repeater on Wednesday evenings from the 7th August. Its just like learning a new language, some will pick it easily and others not, but that doesn't mean you can't give it a try. Come along and join us. The beauty of using the Sandton repeater is that you can join in on Echolink, so you don't even have to be in the Johannesburg area.

Make a date, come along and get CW active, we promise, you will never forget it.



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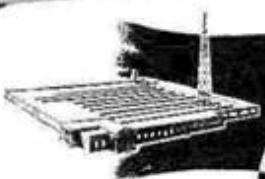
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frequency coverage of any  
communications receiver — from  
540 kc to 110 Mc

This is the long-awaited Hallicrafters SX-42, a truly great communications receiver. The tremendous frequency range of the SX-42, greater than ever before available in a receiver of this type, is made possible by the development of a new "split-stator" tuning system and the use of dual intermediate frequency transformers. Packed with advance features that every ham and every other radio enthusiast desires, the SX-42 clearly lives up to the Hallicrafters ideal of "the radio man's radio."

From now on watch Hallicrafters — the name that's remembered by the veteran, preferred by the radio amateur. See your distributor for demonstration of the SX-42 and for colorful literature describing this great set in complete technical detail.



Because of the precise and thorough engineering that must be done on the SX-42 and because the parts supply has not been continuous, top production peaks have not yet been reached. In the immediate future deliveries will necessarily run behind the demand, but the SX-42 is definitely worth waiting for.



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## Deciphering those component value codes and other pitfalls in older equipment repair

John ZS5JF

Components used in the old boat anchor radios were the types common in that era. Today components have changed somewhat and are usually smaller as the technology has advanced.

In earlier days the components were larger and it was possible to mark the value on the component. With the modern day replacement the space available is less and so a different marking method evolved. Also the way that components, especially capacitors, are classified has changed.

In the older days a typical capacitor might be marked ".01mf". Now you are probably aware that mf is short for "micro-farad", but sadly the American electronic industry made a big mistake here. The prefix mf is actually short for "milli-Farad", which is one thousands part of a Farad. A 1 milli-Farad capacitor is actually a 1,000 $\mu$ F. To be strictly correct the use of the lower case letter f is wrong. The convention used and the letter is either a lower case or an upper case, depending on whether it is named after a person.

The unit of capacitance is named in honour of the British scientist Michael Faraday and hence it should be the upper case letter. So the American method of using mf needs to be translated to " $\mu$ Farad" or simply " $\mu$ F". The Greek symbol mu ( $\mu$ ) signifies the value is one millionth times smaller than the base unit Farad. Hence 1 $\mu$ F is  $10^{-6}$  of a Farad.

The other major designators used for capacitors are the nano-Farad and the pico-Farad. 1 nano-Farad is one thousand times smaller than a micro-Farad, being  $10^{-9}$  Farad. The pico-Farad is also one thousand times smaller than the nano-Farad, being  $10^{-12}$  Farad. The ranges increase or decrease in factors of one thousand times. An even smaller unit of capacitance is the femto-Farad, which is  $10^{-15}$  Farad, or one thousand times smaller than 1 pico-Farad, but this is only used for special applications in measurement.

The modern day convention to mark the value on capacitors is using the pico-Farad and a multiplier system.

A capacitor may be marked 100. One may assume this is a 100pF capacitor, but you would be wrong. The multiplier system adopted is the same as used for resistors. The code for a resistor reading Brown-Black-Black is 100. Brown signified the number 1 and Black signifies the number zero. So it is a 10W resistor, being 1 0 and no extra zeros. Capacitors today use the same logic.

An older days 0.01 $\mu$ F capacitor today is marked 103. This is 10,000pF or 10 nano-Farads. The convention in the numbering system is that numbers from 0 to 999 will be referred to as pico-Farads, but once the number exceeds 1,000 it changes to nano-Farads. So a 1200pF marked capacitor (122) is a 1.2nF. Similarly a 1200nF capacitor is more correctly named a 1.2 $\mu$ F.

A capacitor marked 104 is the old 0.1 $\mu$ F but today it is called a 100nF. A 1 $\mu$ F capacitor is marked 105 and a 106 marked capacitor is a 10 $\mu$ F.

A capacitor marked 222 is a 2200pF or more correctly known as a 2.2nF. An older designated 0.47 $\mu$ F is today a 470nF and is marked 474.



Typical disk ceramic capacitor marking

One of the other oddities of the earlier American numbering system was the use of a “*double designation*” system. Looking at old data sheets it is common to come across values such as “30 mmf” or “30 uuf”. The use of a double designator causes confusion. The 30 mmf or 30 uuf is actually meant to represent a 30pF capacitor. Fortunately this archaic system has been dropped.

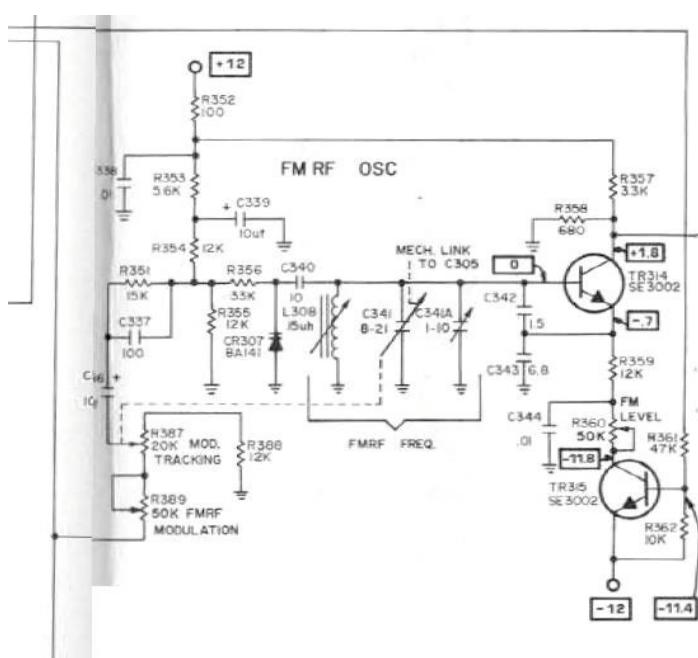
### Beware the missing decimal points!

A common problem when repairing or restoring older equipment is the quality of the schematic diagrams available. It is not unusual to find in a less than pristine copy for the schematic that certain details are missing. A classic example is the decimal point used for resistor or capacitor values. Many of these schematics can be found on various websites but some are poor reproductions.

The older method of denoting a resistor value was to use a decimal point (period symbol) but if the copy is poor these are very difficult to ascertain the correct value, unless you have also a copy of the parts list. A  $4700\Omega$  resistor would be shown as 4.7k, but if the decimal point is poorly printed then it becomes a  $47k\Omega$ . In more recent years the industry changed to a different method that mostly avoided this sort of problem. Today the resistor on the schematic would be shown as 4k7 and even with a poor copy it is more easily observed.

Another shocker I came across recently concerned an inductor used in a sweep generator. I was asked for advice on fixing this and was sent a copy of the schematic to peruse. The copy of the circuit clearly stated it was a  $15\text{f}$  H inductor, but calculations of the capacitors in the oscillator circuit suggested it oscillated on about 10.7MHz. This made sense as the unit was for aligning FM broadcast receivers and the common IF is 10.7MHz. Normally the IF would be adjusted to give the correct response before the RF stages were adjusted. The copy of the schematic looked fairly good so I was surprised at the next part of the saga.

Upon querying if my assumption was correct I was told the sweep generator covered 88 to 108MHz and the inductor was actually  $0.15\text{f}$  H, as confirmed by the parts list. The schematic did not show a 0 before the other numbers so I had no inkling that there was supposed to be a decimal point before the 15. That is an example of a really poor attempt to show a component value and it is something often found in earlier diagrams. Today the correct way of specifying that inductor would be  $150\text{nH}$  and then the error would have been obvious.



### The schematic with the $15\text{f}$ H inductor.

#### See if you can spot the decimal point.

It is common to find the diagrams miss a vital 0 before a decimal point and capacitor marked simply as “ $.01\mu\text{F}$ ”, on a poor printed copy you may surmise the correct value is  $0.1\mu\text{F}$ .

Without an itemised parts list you have no way of telling what the correct value really is, and an itemised parts list can also contain errors. Note on the schematic the way that voltages are shown. The emitter voltage of TR314 is actually  $-0.7\text{V}$  but at a cursory glance it looks more like  $-7\text{V}$ .

## Antique Wireless Association of Southern Africa Heathkit Challenge

The following application form needs to be filled in and submitted to the AWA in order to take part in the Heathkit Challenge, which involves the restoration and operation of either an HW100/101 or SB101/102 transceiver. The contest will be judged by John ZS1WJ and Rad ZS6RAD to see who will take the 1<sup>st</sup> place.

In order to enter the contest one needs to show proof of the restoration process of the radio by taking photos of before and after and then to use the radio in an on air test to prove operation of the rig. A written description of the history, that you may know of, and all work carried out to get the rig back into working condition will need to be provided too. You should have someone witness the on air test and sign at the bottom of the page.

If possible, the radio should be brought along to the AWA AGM in November and placed on display.

Name: \_\_\_\_\_

Call Sign: \_\_\_\_\_

Type of Radio: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Give a description of the condition of the radio before starting the restoration:

---

---

---

Give a description of work carried out to get the radio back into operation with reference to photos which may be printed and attached:

---

---

---

(Should more space be needed, you can attach additional information to this page)

On air test conducted between (call) \_\_\_\_\_ and myself (call) \_\_\_\_\_

on the date \_\_\_\_\_ witnessed by \_\_\_\_\_

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

*(By signing this document you agree to the decision of the judges and confirm that you have carried out all the above mentioned work in order to restore the radio)*

## The Heathkit Challenge.

Don't forget about the Heathkit Challenge coming up at the AGM at the end of this year.

As a reminder, John ZS1WJ (our president) put a challenge to everyone to find a Heathkit SB/HW101 and restore it as part of an endeavor to bring back some of these fine old kit radios, to life. The idea is that you find an old Heathkit SB/HW101 and document the restoration process from the time you received it to the time you finish it, hopefully in all its glory, firing on all tubes and working the way it was designed to.

There are still many of these fine old rigs out there somewhere and so it will be a challenge to find them, and then to restore them.

Once you have documented the process you have gone through to restore the rig, the object is then to convince the panel (still to be decided) that your restoration project was the best one and you can win R1000.

The decision of the judge/s will be final and the winner will be announced at the AGM in November. So there's not that much time left to get stuck in and do your restoration, document it all and get your project in. Documents can either be sent to myself, ZS6ADY or Rad ZS6RAD or John ZS1WJ. Email addresses can be found on the SARL website or if you are in doubt simply contact the editor and I will pass on details to you.

Even if you are out of SA and want to partake in the challenge, you are quite welcome to do so.

In Discussion with John, we have decided on a few things that entrants need to do :

1. You need to document the process you have gone through during the restoration. This must be corroborated with a few pictures of the before and after process that has taken place.
2. Before the judging, there will be an opportunity to do on air testing. This will more than likely be done per province or area where one can be heard due to propagation conditions at the moment.
3. If you stay in the Gauteng area and can be at the AGM in November, then you will need to bring the radio along to put it on display. (If you are coming from out of town and want to bring your radio along to put on display you can do that too).
4. An entrance form will need to be filled in for the competition. The entrance form can be emailed with supporting documentation.

As a precursor, it would be interesting to know how many people are actually going to take part. Send us an email just to let us know how things are going with your rebuild.



HW 101



SB 101

**CONTACT US:**

P.O. Box 12320  
Benoryn  
1504

Mobile: 082 448 4368  
Email: andyzs6ady@vodamail.co.za

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**Antique Wireless Association  
of Southern Africa**

**Mission Statement**

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterdays radio's and associated equipment. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association. Join by logging in to our website.

**Notices:****Net Times and Frequencies (SAST):**

Saturday 06:00 (04:00 UTC) —AM Net—3615  
Saturday 07:00 (05:00 UTC) —Western Cape SSB Net— 3630  
Saturday 08:30 (06:30 UTC)— National SSB Net— 7140; Sandton repeater 145.700  
Echolink—ZS0AWA-L; ZS6STN-R  
Relay on 3615 for those having difficulty with local skip conditions.  
Saturday 14:00 (12:00 UTC)— CW Net—7020; (3550 after 15 min if band conditions not good on 40)  
Wednesday 19:00 (17:00 UTC) — AM Net—3615, band conditions permitting.

**For Disposal:**

Racal RA17 and service Manual  
Last turned it on about 15 years ago and it was working then.  
Pretty dusty now and might need some TLC but should still work.  
Offers around R2k

Situated in Bergvliet, Cape Town.

Contact Graham Lambert  
[graham@versatronics.co.za](mailto:graham@versatronics.co.za)  
021 713 1334 or 082 419 1334

**Notice of AWA AGM:**

Notice is hereby given of the Antique Wireless Association of Southern Africa Annual General Meeting to be held on Saturday 09 November 2019 commencing at 09:00 at the premises of the SAIEE in Observatory Johannesburg.  
All members are invited to attend and join in.  
Voting for the next Vice President, President in waiting, will be called for as well as posts for members of the committee as per our Constitution of 2014 (revised).  
Should you not be able to attend but would like to put forward any nominations or suggestions for the next year, please email your suggestions to any member of the present committee.